

# GPS/GIS Advances in Forestry

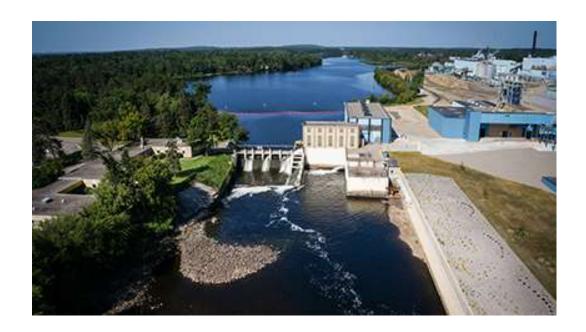
Adam Sutherland UPM Blandin Forestry April 5<sup>th</sup>, 2016



## The Biofore Company **UPM**

#### **Outline**

- Overview of UPM Blandin
- Blandin GPS/GIS History
- Field and Office GIS
- GPS for Operators
- What's Next



## The Biofore Company **UPM**

#### **Overview of UPM Blandin Paper**

- Mill opened in 1901 (Itasca Printing Company)
- Purchased by Charles K Blandin and became the "Blandin Paper Company" in 1929
- World leading producer of lightweight coated paper
- 1400 tons of paper/day (25tons/day in 1902)
- Acquired by UPM in 1997
  - Headquartered in Helsinki, Finland
  - Global leader in paper market
- Mill employs ~ 400 people

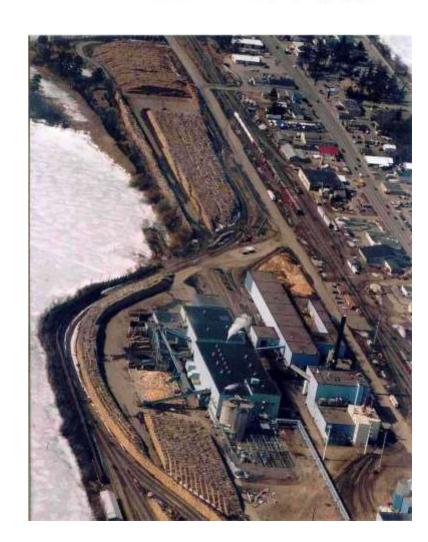




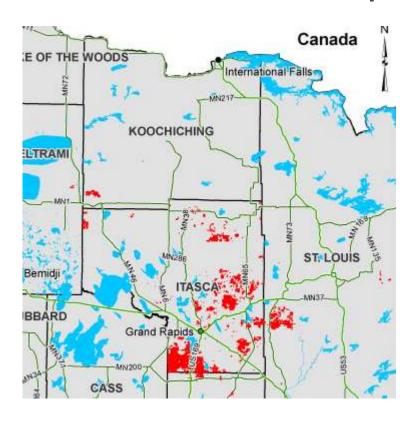


#### **Overview of UPM Blandin Paper**

- Blandin Forestry is responsible for supplying the paper mill with the timber it requires and for sustainable management of UPM forests. (Over 200,000 cords of high quality aspen, balsam, and spruce)
- UPM owns and manages 187,876 acres of forest land making it one of the largest private owners in Minnesota.
- Staff = forest manager, ecologist, 7 field foresters



#### **Overview of UPM Blandin Paper**

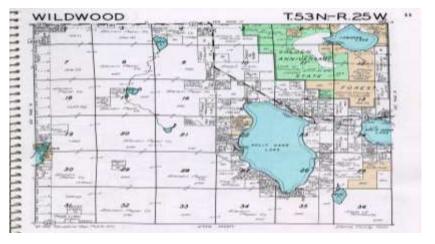


- •Average distance <30 miles to mill
- Above average productivity potential





•120 Miles of maintained system roads



Well-blocked ownership



#### **History Leading to Current Technology**

- Traditional non-tech forestry tools have done the job for decades
  - Hand drawn maps
  - Compass and string box
  - What's your pace?







## 1990's – Recognized a need for better mapping



- GIS full speed ahead
  - Arcview software
  - Contracted with ProWest
  - Digitized all forest layers
- Continuous support from management to allow investment
- Constant support from outside contractors specializing in up-to-date techniques and equipment

#### Late1990's

#### **Explored GPS**

- GeoExplorer II (boat anchor #1)
- ProXR (submeter) (boat anchor #2)







#### **Early 2000's**

## The Biofore Company UPM

#### Fully Utilized GPS with ArcPad

- HP Ipaq's with Garmin
- GeoXT,s
- Still connected by wires, clunky, poor batteries





#### **Today**



#### No Wires!

- ArcPad v10.02
- Juno's (9) 3-5' accuracy
- Geo7 (3) sub foot accuracy

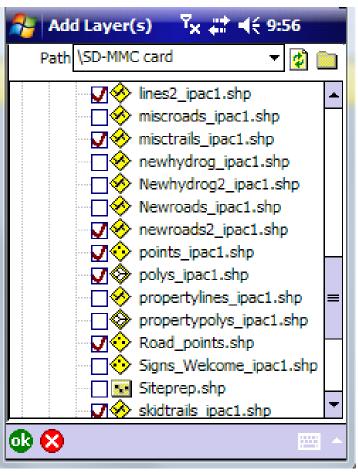






#### Office/Field Workflow

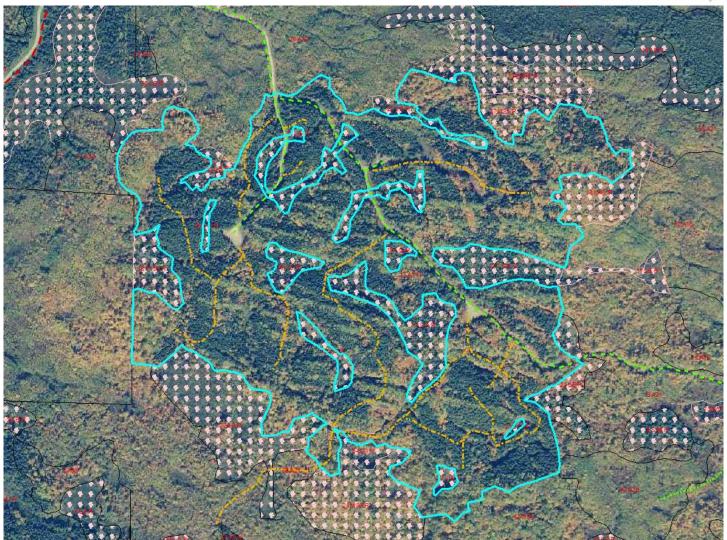
#### Shapefiles for Feature Mapping



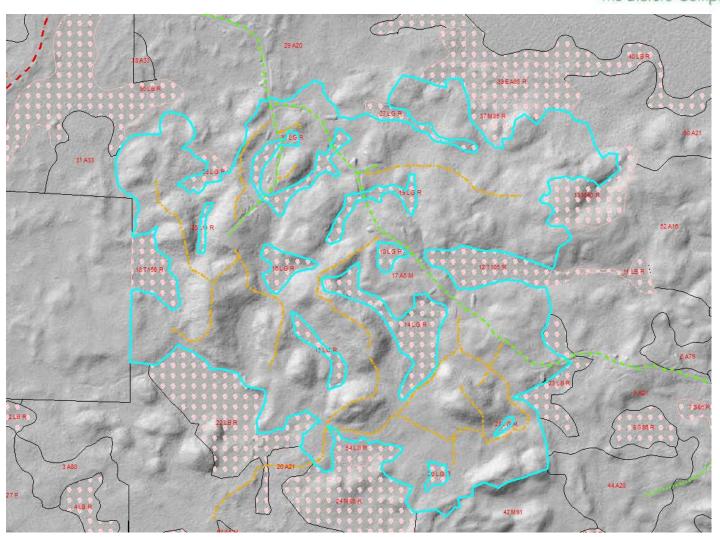
#### **Personal Shapefiles**

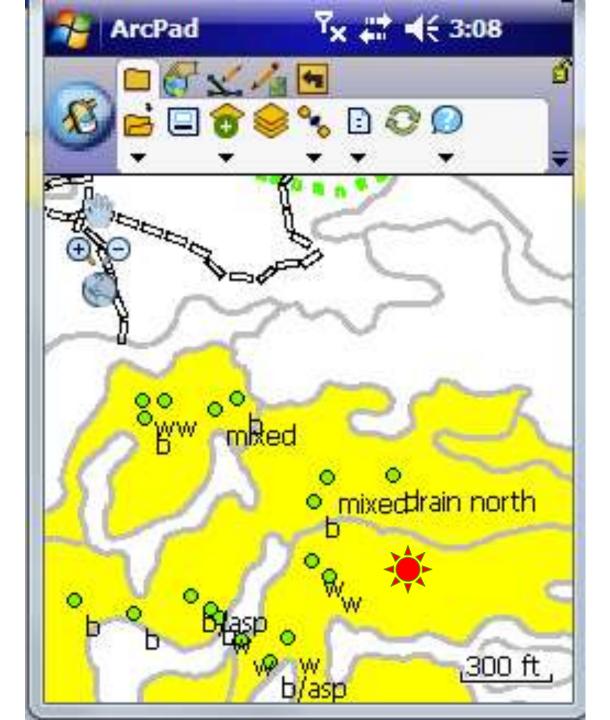
Points
lines
trails
roads
hydrology
skidtrails
road\_Points
Polys
Etc....











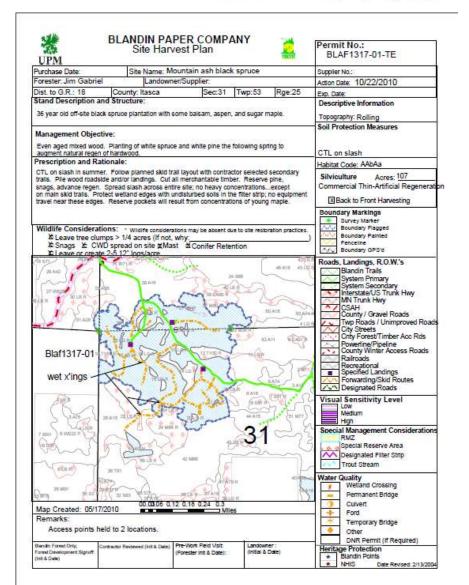


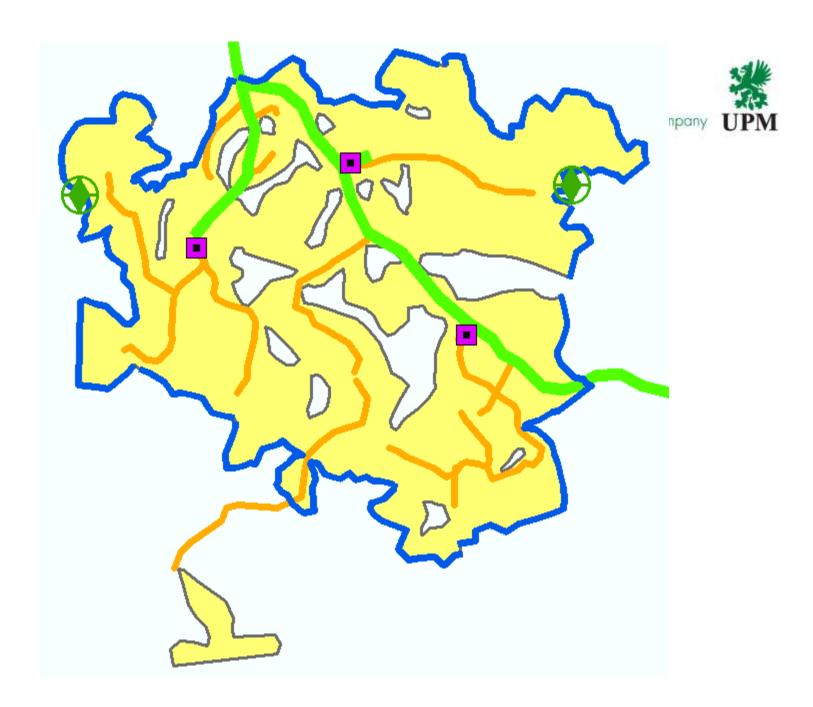


#### **Timber Sale Design**

- 70% summer access
- Adherence to Site-Level Forest management Guidelines
- Protect site Resources
  - Hydrologic
  - Cultural
  - Wildlife
  - Productivity
- Summer Roads
- Skid Layout and trafficking
- Spatial accuracy in mapping
- Seldom travel the same ground twice

# Forester Efficiency is Key!





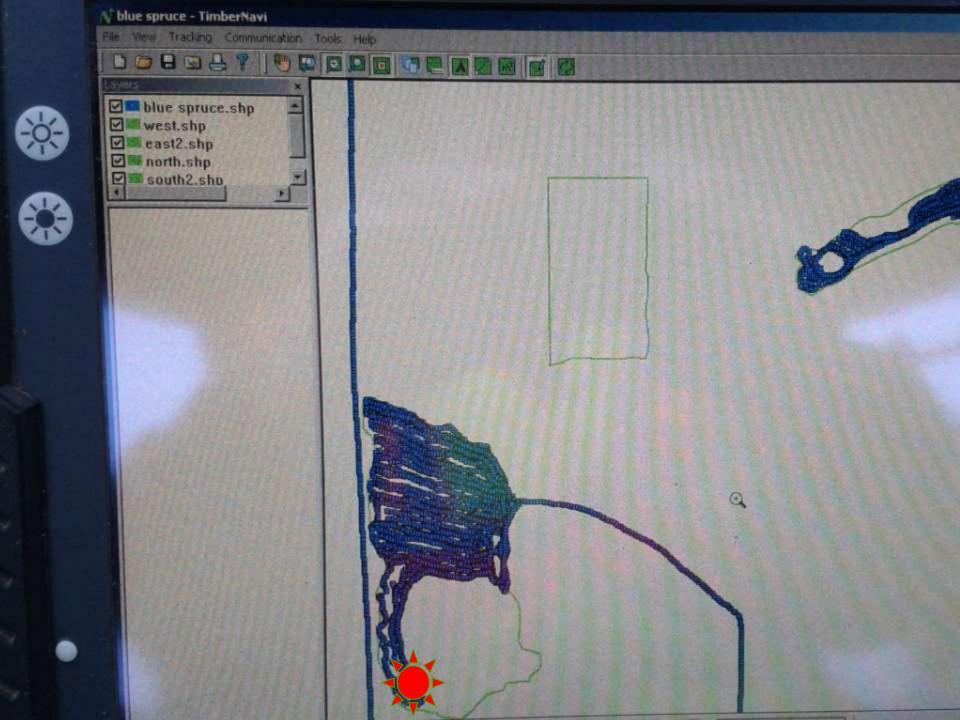


### **GPS** in Harvester































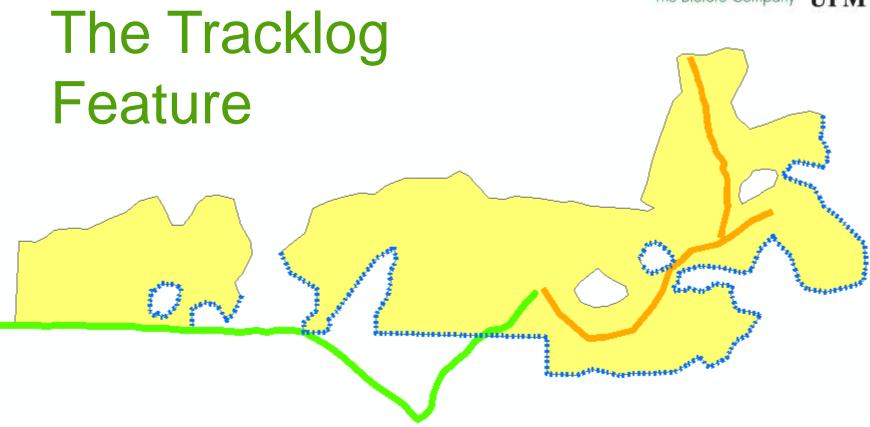


# The Biofore Company UPM

#### Cost

- Costs of installation vary greatly among applications
  - Handheld Trimble Juno with ArcPad software ~ \$1000
  - Installation of GPS receiver on cab (JD or Ponsse) ~ \$1000-1300
  - ArcPad (or similar software) alone ~\$250
  - Simple handheld Garmin/IPAQ ~ \$500 or less
  - Total costs typically range \$500-2500
  - Started with one CTL processor in 2008, today we have over 30 machines working for us and utilizing GPS tech.

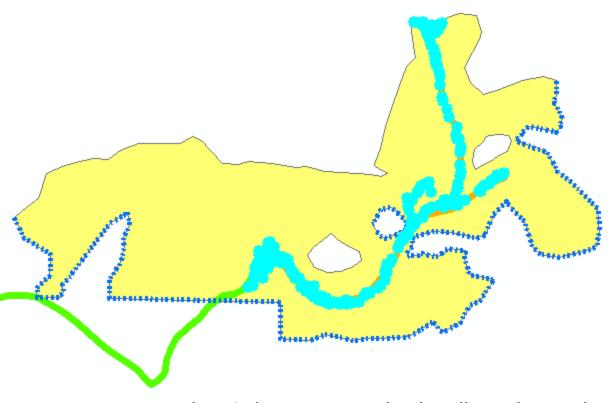




SHOWTTD	NAME
0	slg09/11/09 07:12:41
0	clg09/11/09 07:18:55
0	slg09/11/09 07:22:52
0	clg09/11/09 07:24:40
0	clg09/11/09 07:26:56
0	clg09/11/09 07:30:19
0	
0	clg09/11/09 07:32:53
0	clg09/11/09 07:34:02
0	clg09/11/09 07:40:37
	clg09/11/09 07:43:38
n	alan9711709 07-88-39

Sept 11, 2009 7:12am





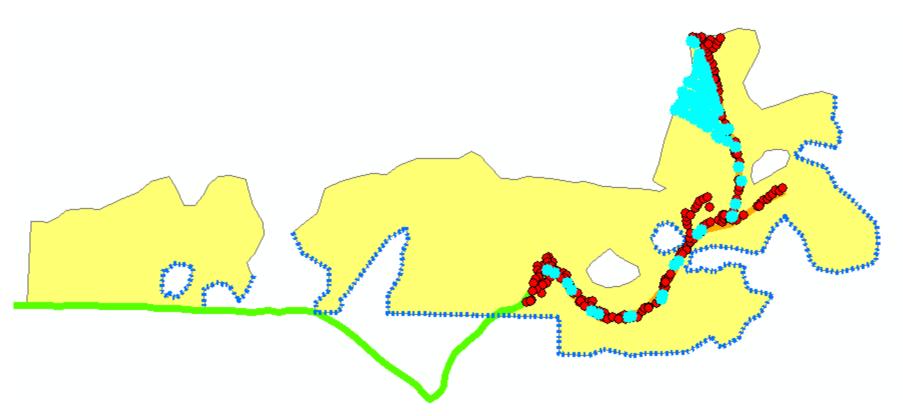
0	clg09/11/09 15:50:55
0	clg09/11/09 15:54:35
0	clg09/11/09 15:56:29
0	clg09/11/09 16:12:10
0	clg09/11/09 16:13:12
0	clg09/11/09 16:16:04
0	clg09/11/09 16:17:29
0	clg09/11/09 16:28:41
0	clg09/11/09 16:29:48

day 1; he cuts out the landing, the main skid trails and he cuts a little on the very back of the block.

Sept 11, 2009 4:29pm

## Day 2

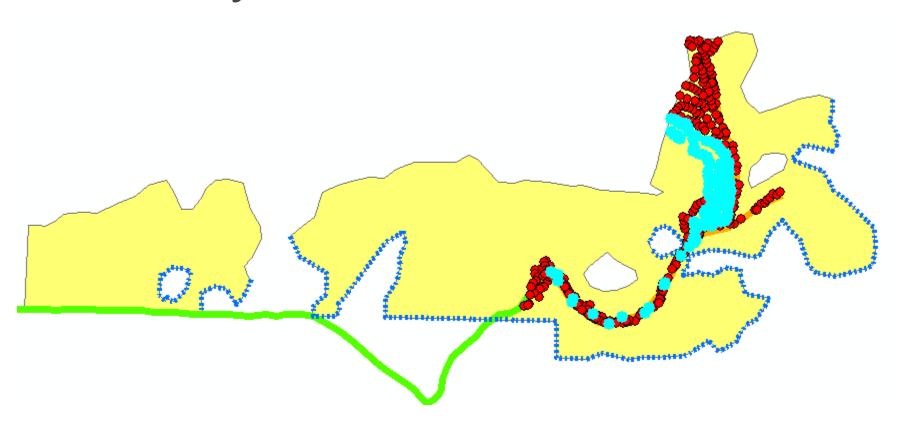




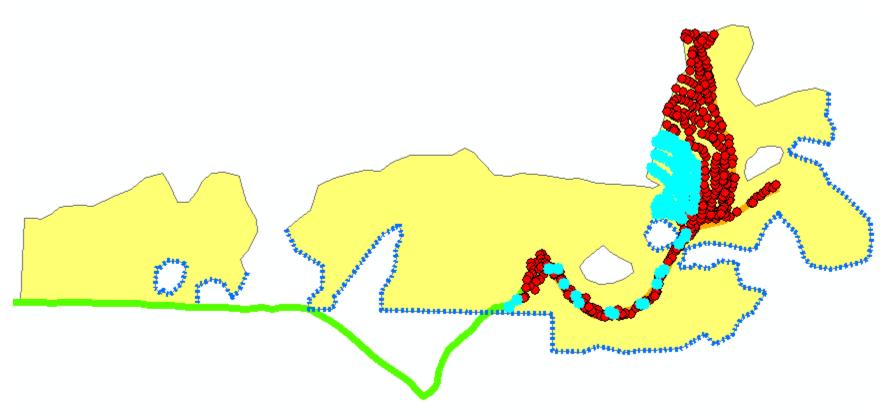
Day 2, he goes back to where he left off and cuts out a pretty good sized patch. About 2 acres.

## Day 3



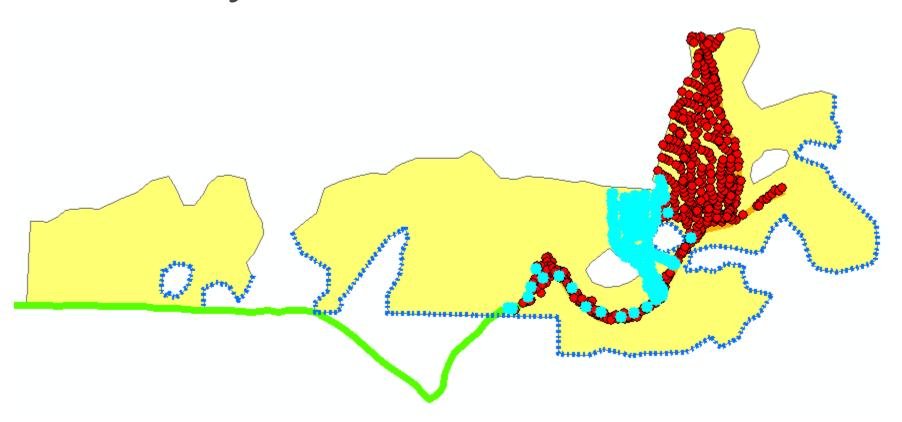






Day 4, another 2 acres. You begin to see why the primary skid trail needs the best slash mat.





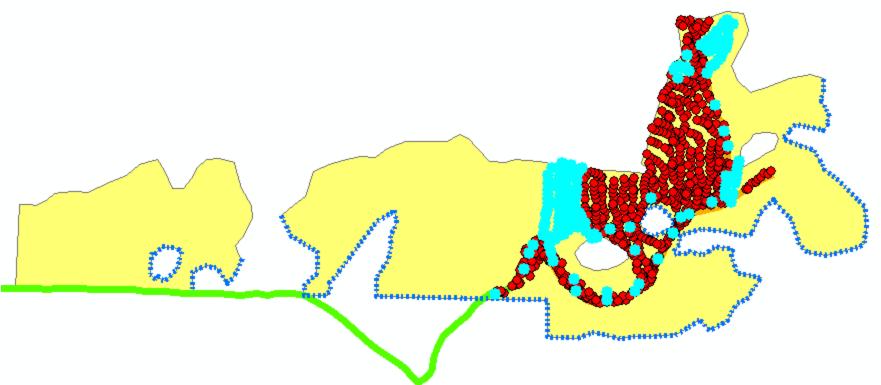


SHOWTTD NAME  0 slg09/18/09 06:45:43 0 clg09/18/09 06:46:46 0 clg09/18/09 06:48:13 0 clg09/18/09 06:49:19 0 clg09/18/09 06:50:22	Sept 18, 2009	6:45am	
			Handan and the state of the sta

0	clg09/18/09 08:50:24
0	clg09/18/09 08:51:31
0	clg09/18/09 08:52:38
0	clg09/18/09 08:53:43
0	clg09/18/09 08:54:47





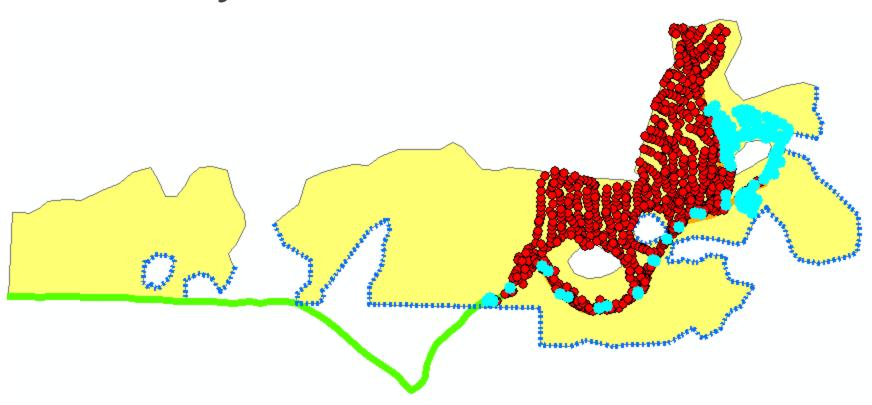


Day 7...a big day. Gets 3.2 acres.

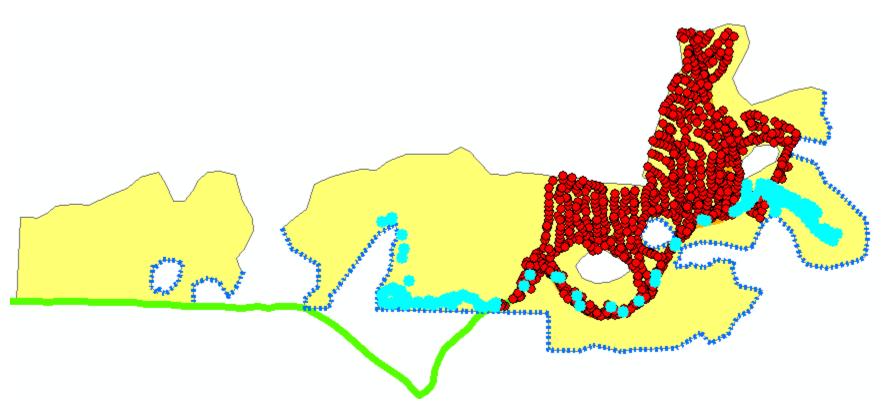
Machine worked from 6:35am to 4:20pm.

Cuts a big block near the landing than heads back to the back again and starts cutting there.



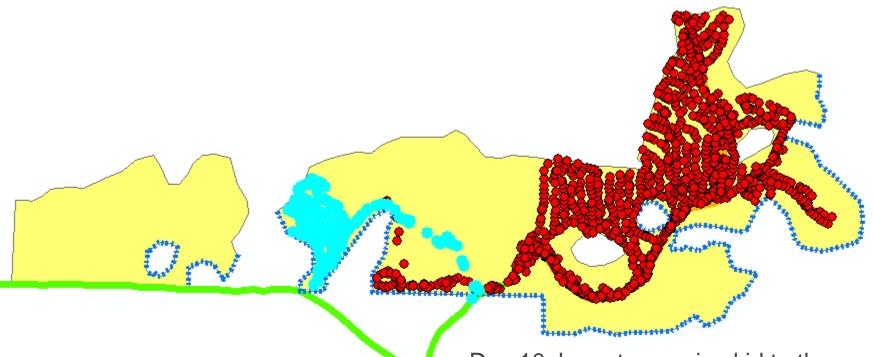






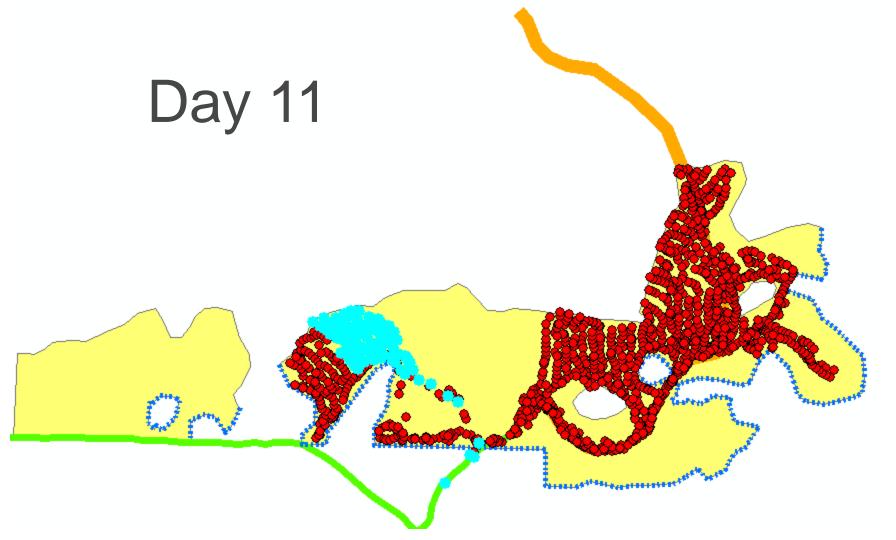
Day 9 an interesting one. Cut in the morning to the east, but finished the day along the south property line.



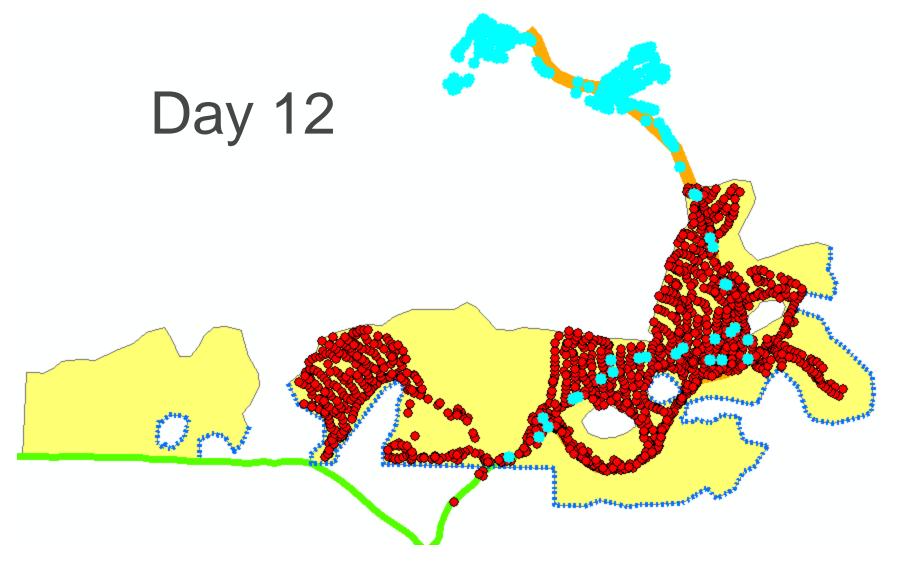


Day 10, he cuts a main skid to the west and a pretty big pocket gets cut out. This area was saved to take advantage of drye weather. The plan being to save the east area in case of some rain, and get working on ground that was a bit more sensitive,

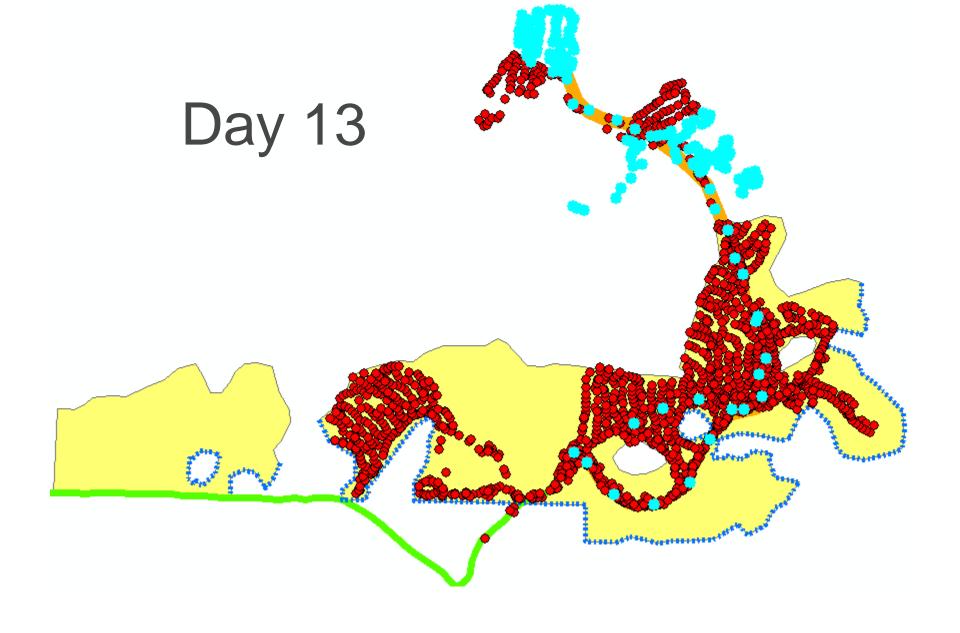
but now safely operable.

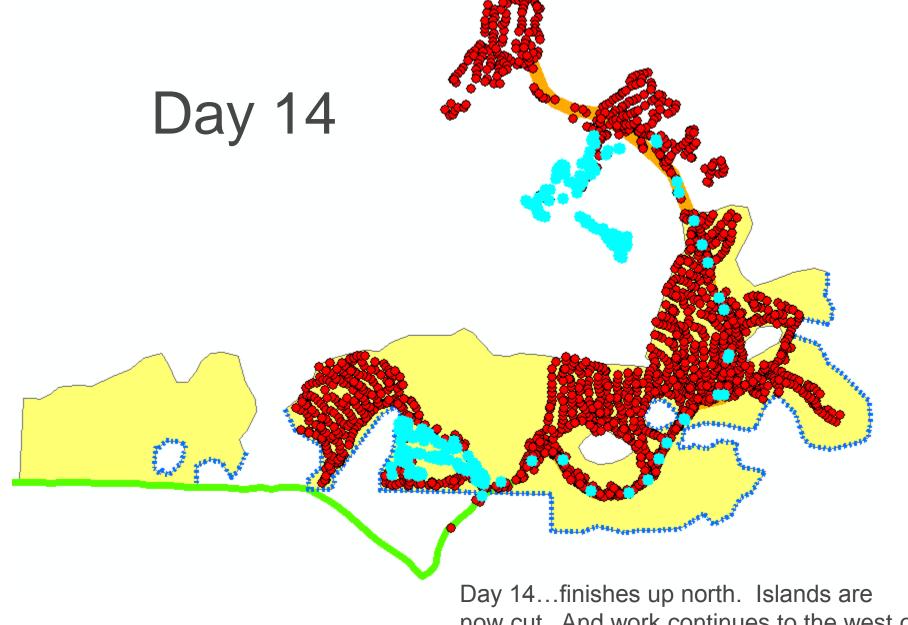


Day 11, He cuts to the west again, but the conditions are so dry, that the operator would like to harvest some aspen to the north across some previously marginal wet ground.

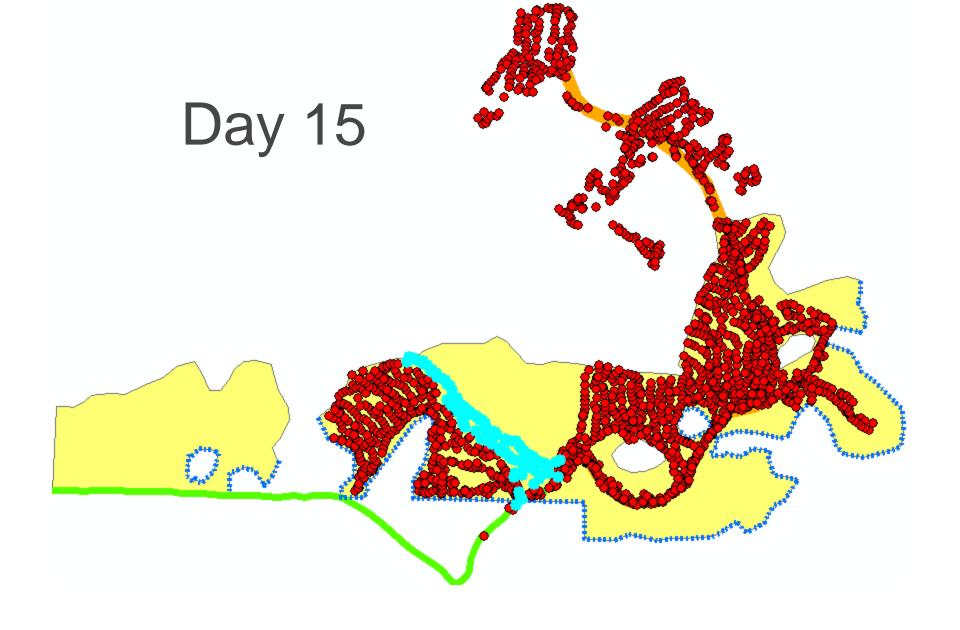


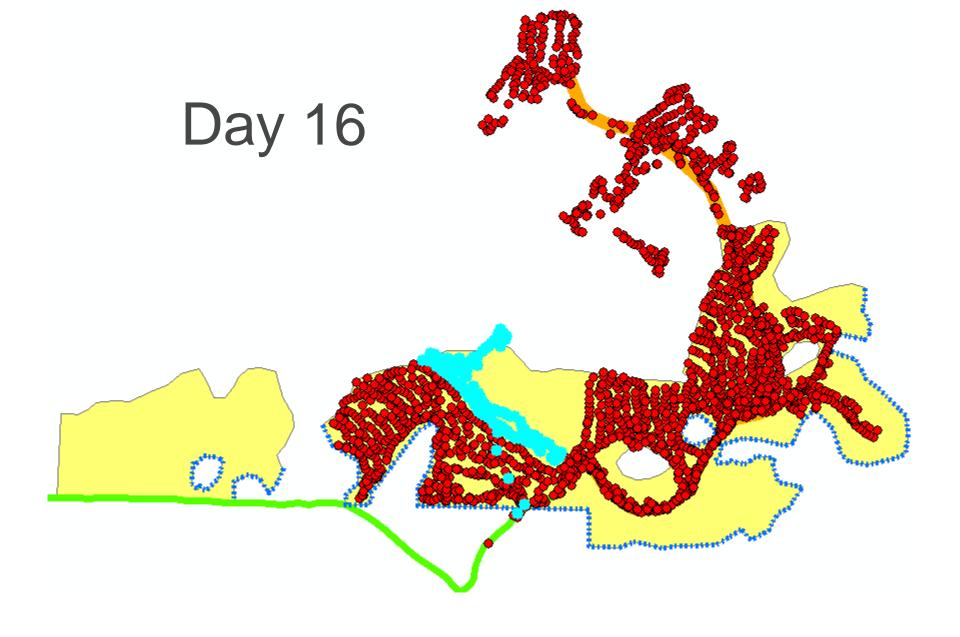
Day 12, After a short discussion with the forester, the work begins.

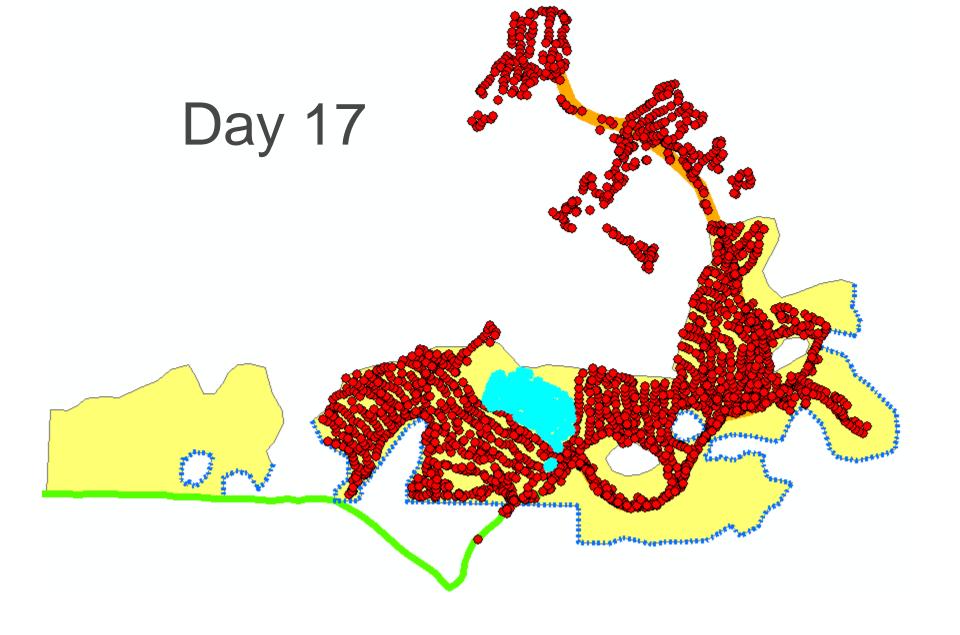


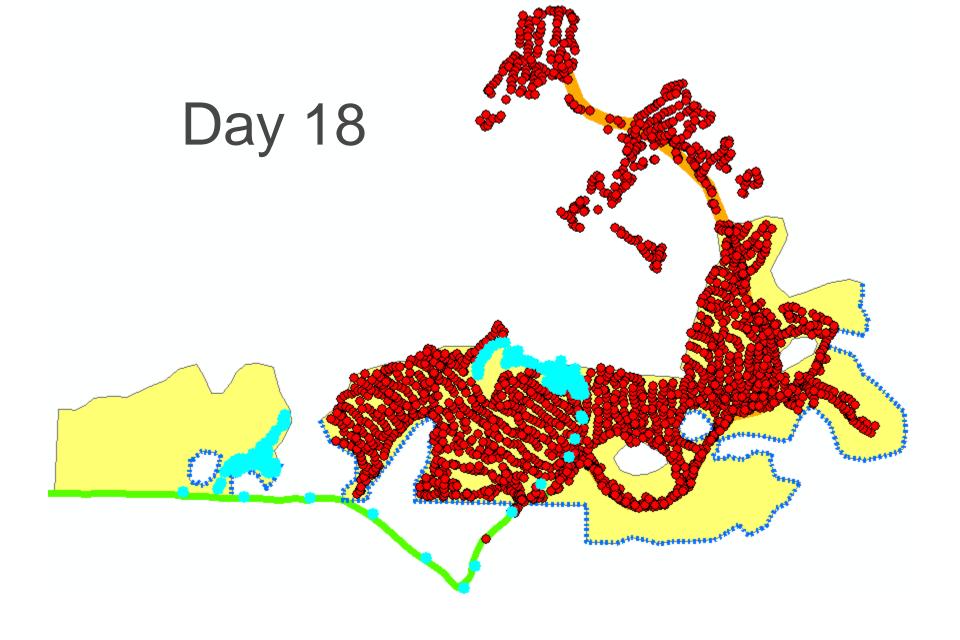


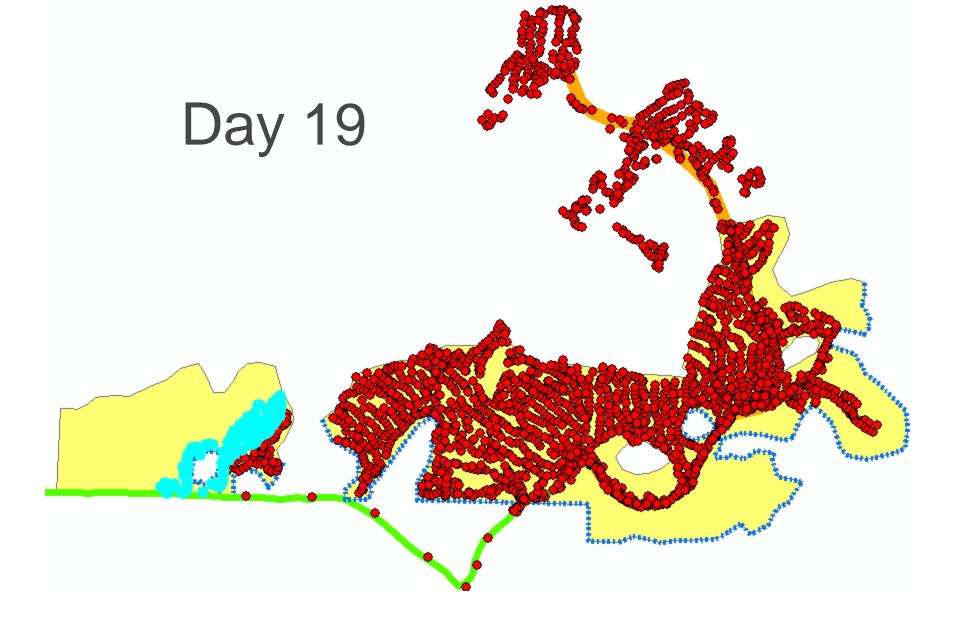
Day 14...finishes up north. Islands are now cut. And work continues to the west of the landing.

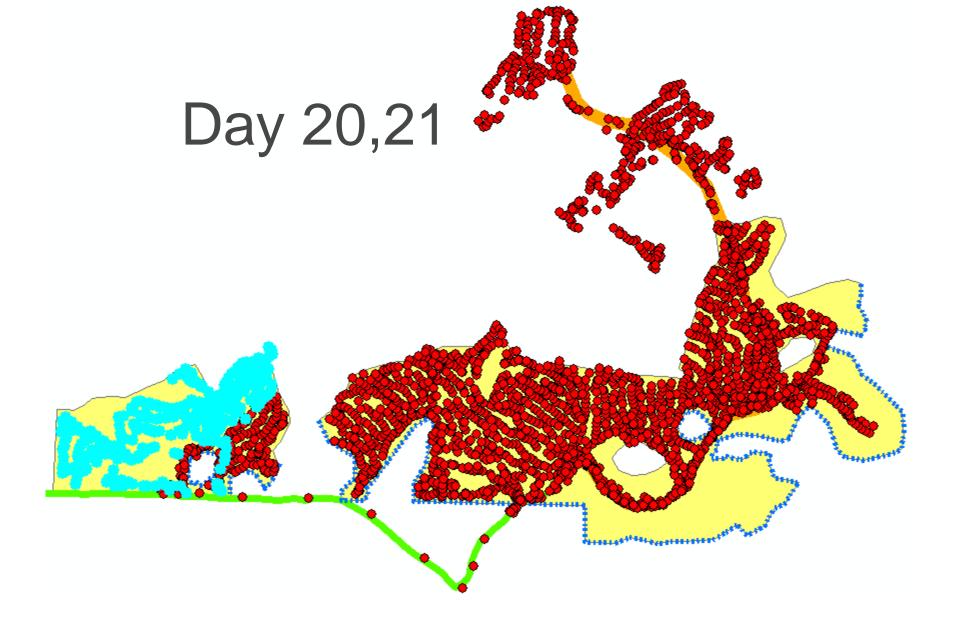


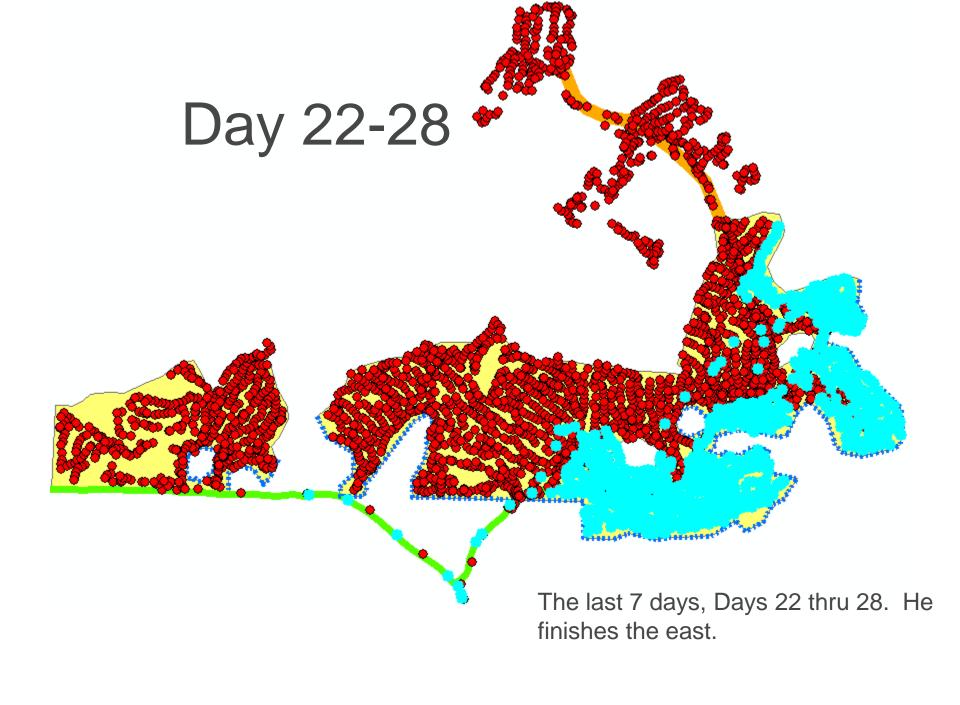


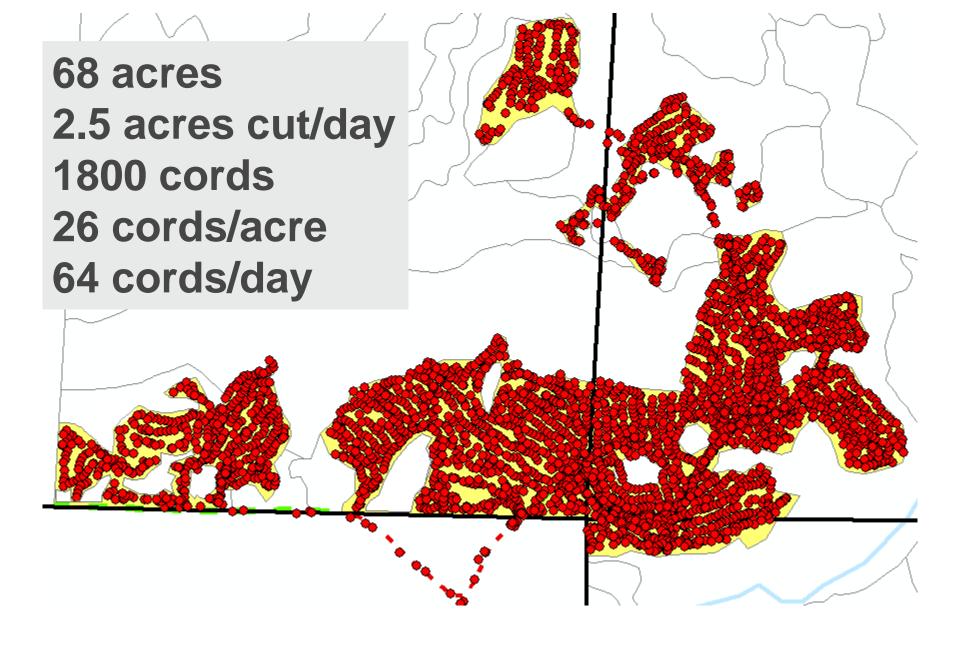


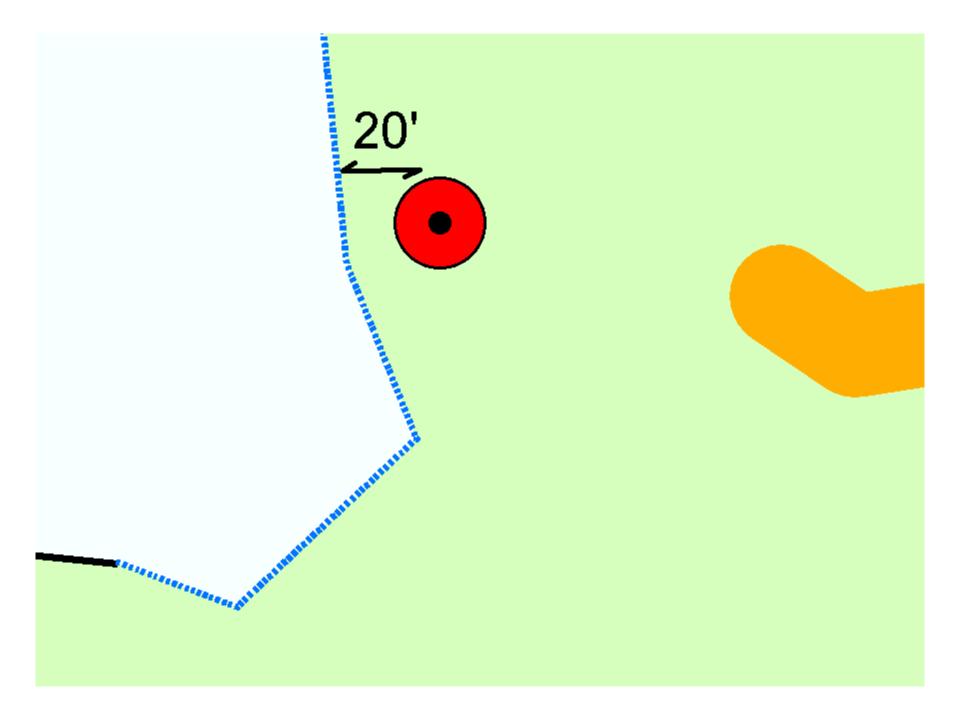


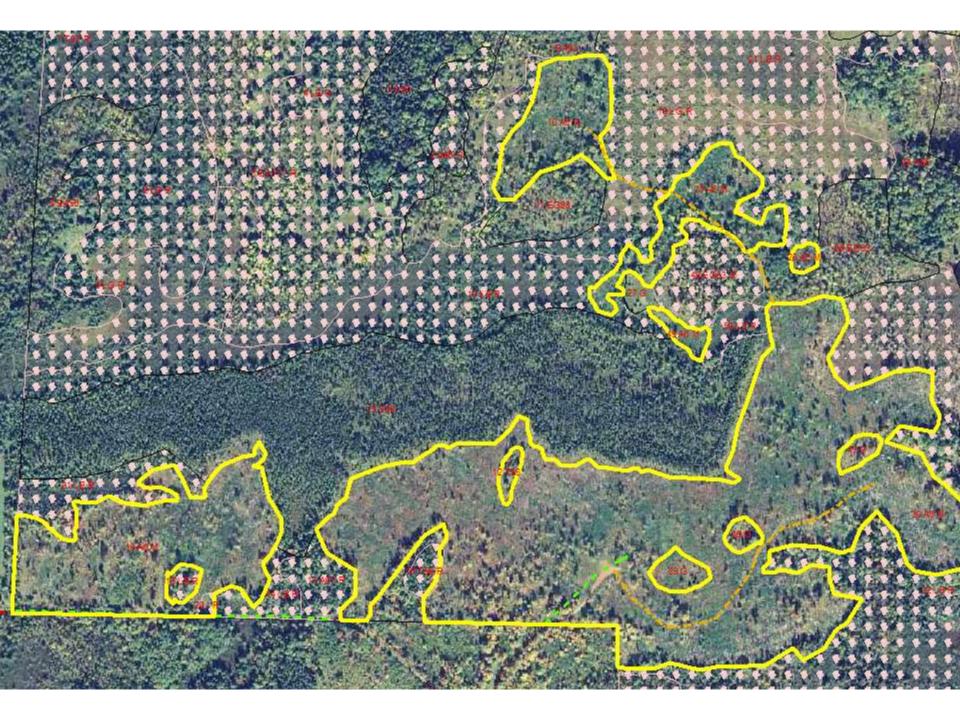


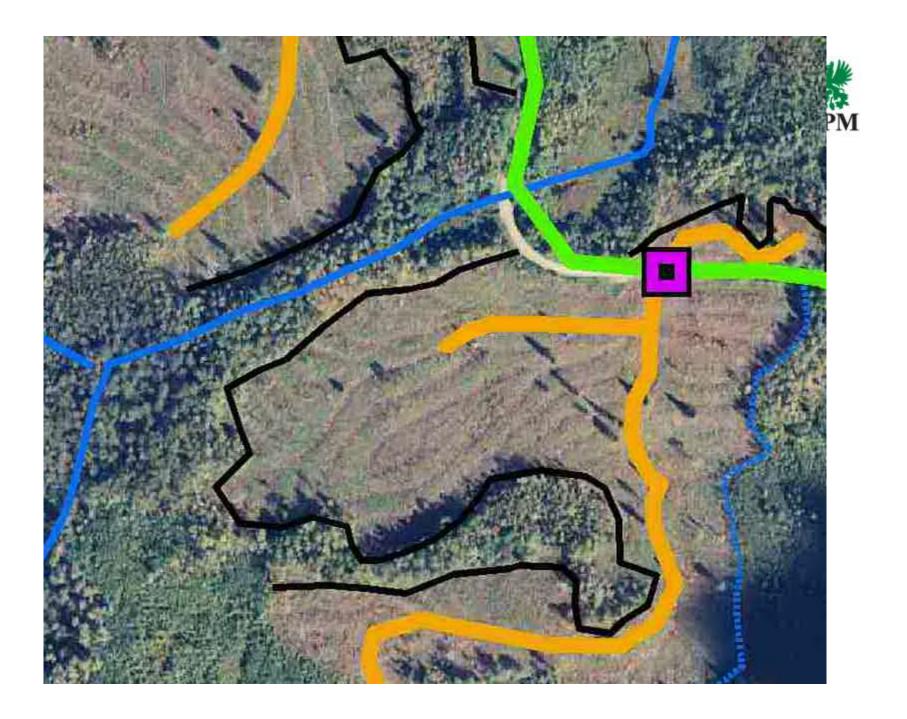


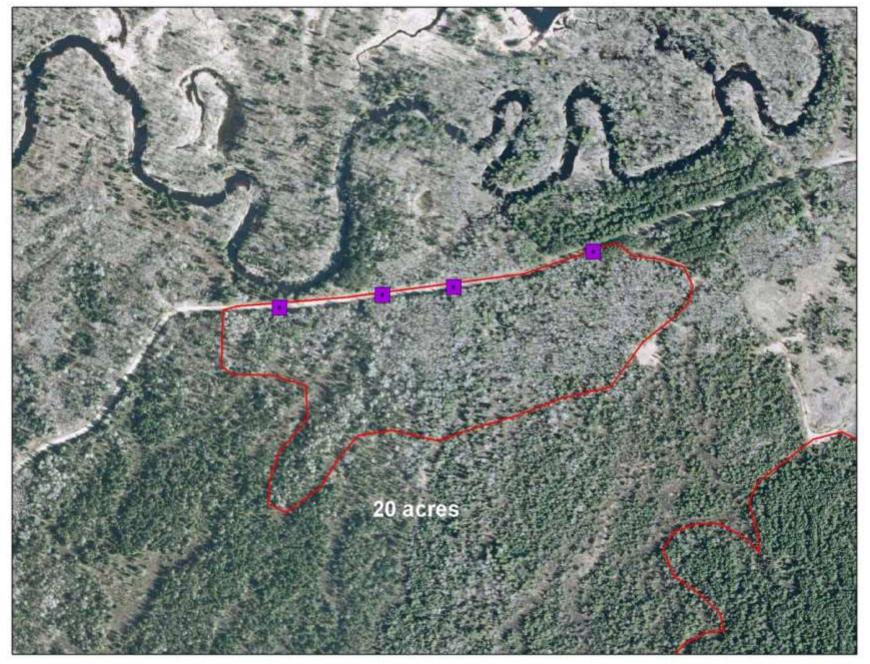


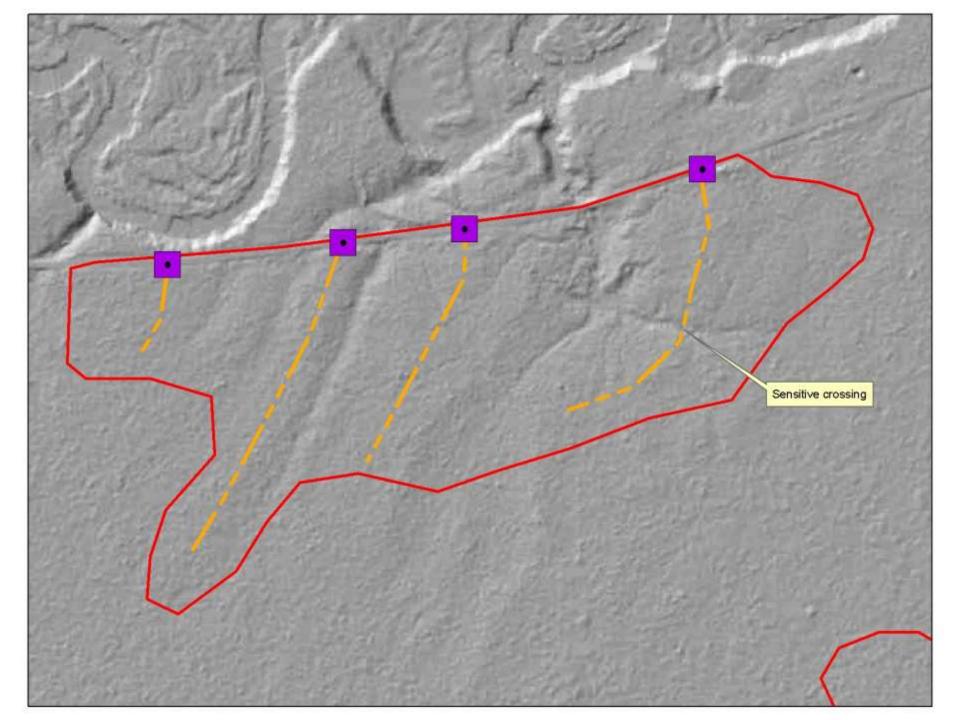














## What's next?





### Web based



Home Gallery Map Scene Groups My Content My Organization

Open ▼ Details



Facebook Twitter

Owner: upmblaforestry

Contributors: Members

Status: Organization

**Group Details** 

Tags: loggers

3 Members

upmblaforestry

asuth\_upmbfgr logger\_upmbfgr



LEAVE THIS GROUP SHARE

No summary was provided for this group. ¥

#### **Group Content**

#### All Results

Maps

Layers

Scenes

Apps

Tools Files

Show ArcGIS Desktop

Content

UPM Wdbskt Updated 1-20-2016

Web Map by asuth\_upmbfgr

Last Modified: March 27, 2016

(0 ratings, 0 comments, 840 views)

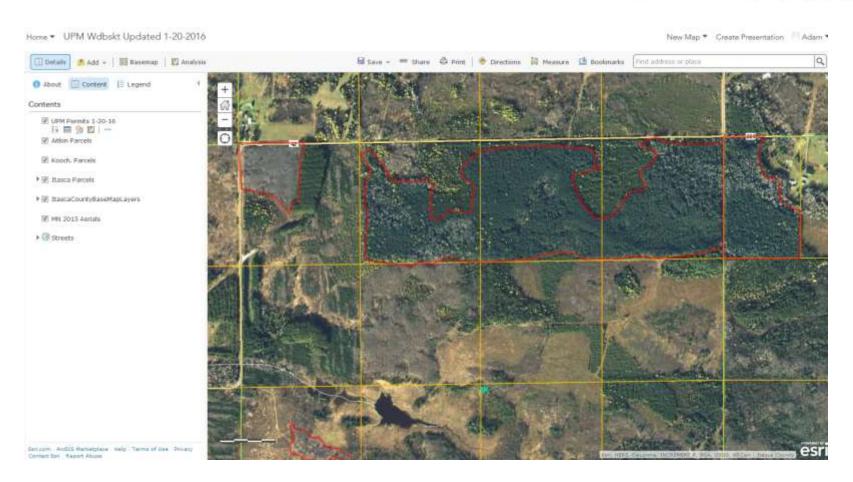
UPM timber permit info

Title A Owner Rating Views Date

62 | © UPM



### Web based - web connection in cab





## Web based – smartphones/tablets





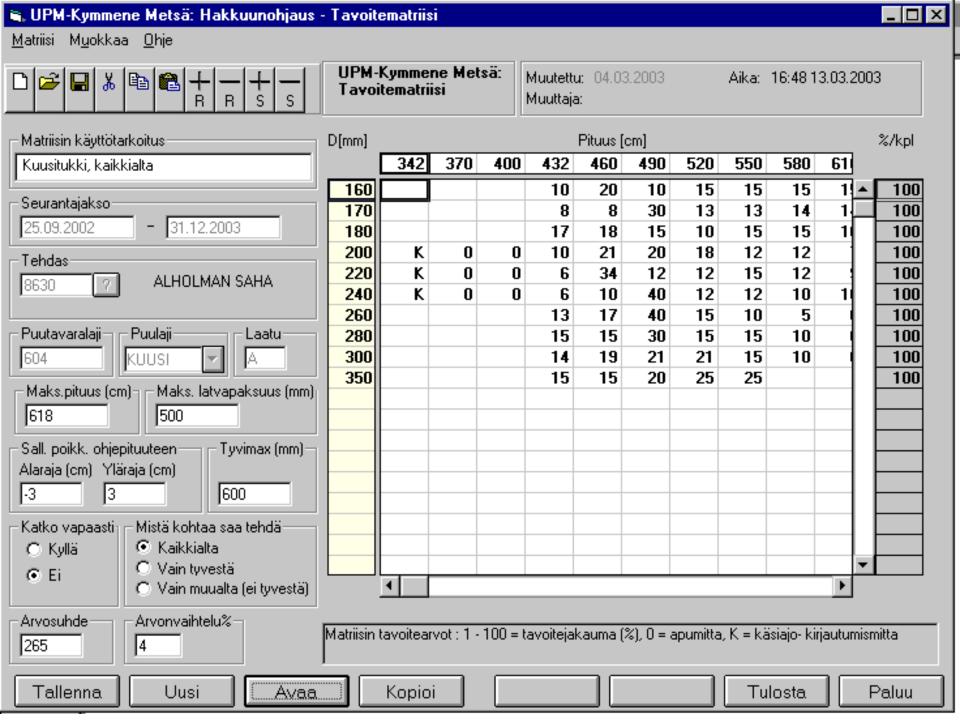
## **Finnish Technology**





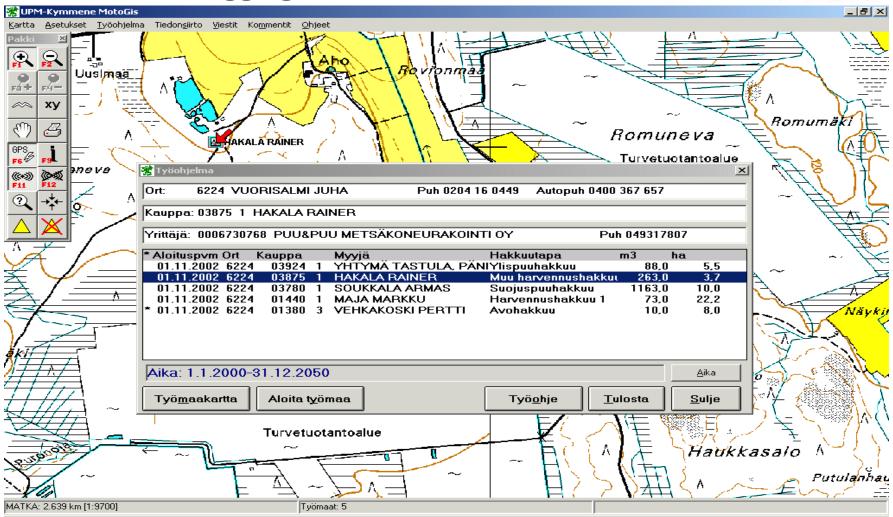
## **Logging Equipment - Measurement**







## **Harvester's Logging Order**



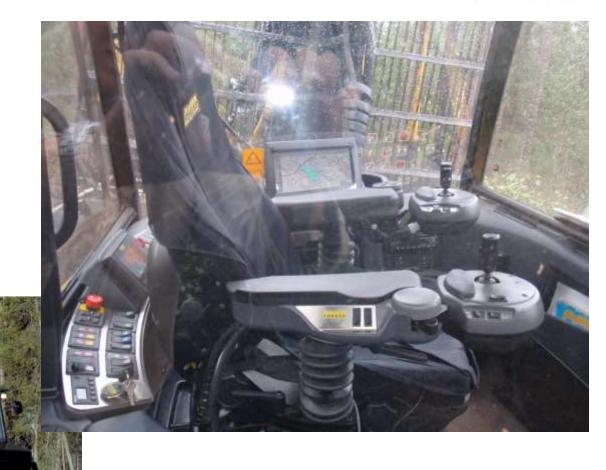


## **Feedback From Harvester**

UPH-Kymmene Hetsä USEITA KAUPPOJA Ptl:600 Kut Tehdas:												01.05.00-05.06.0	)0				
!LH !	Pituu 340			сн 430	460	490	520	550	580	610				!	YH' kpl	TEENSÄ ! #3 !	Jak.
!148! !150!				38	110 16	67	68	23	11					!	317 16	44.63! 1.75!	2.9
!153! !155!				25 194	4 143	2 141	3 173	3 141	2 96					!	39 888	4.73! 118.82!	.4 8.2
!160! !170!	12			280 173	217 136	140 85	113 70	94 55	94 92	16				!	966 611	137.39! 93.87!	8.9 5.6
!180! !200!	163 249	85 183	4	247 275	262 239	164 180	171 180	84 192	105 86	19 4				!	1300 1592	213.25! 299.18!	
!220! !240!	14 2	5	328 168	193 153	246 176	218 153	220 171	243 210	114 83	1				!	1582 1116	368.52! 313.04!	
!260! !280!		1	3 2	164 101	148 115	151 119	172 180	154 91	74 76					!	867 684	288.28! 261.83!	8.0 6.3
!300! !320!			_	120	147	143	218	152	83					!	863 14	428.03! 6.85!	7.9
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## **Logging Equipment - Forwarder**



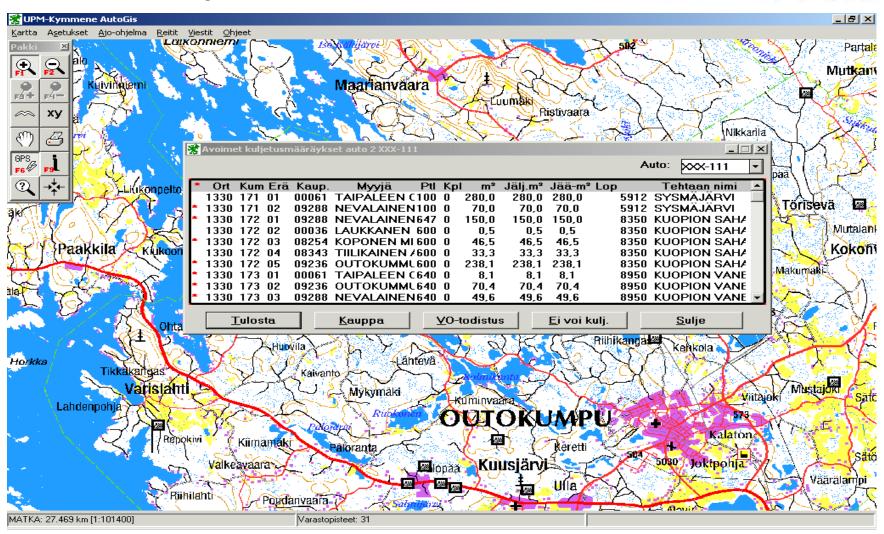


## **Transport Equipment – Truck**





### **Truck's Transport Order**







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